

Update on the effect of a large wildfire on stream-nutrient concentrations within an undisturbed watershed in the Lake Tahoe Basin

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Background

The “Gondola Fire”, the largest wildfire in recent history within the Lake Tahoe Basin, burned the Eagle Rock Creek watershed in July 2002 (fig. 1). The fire burned 28 percent (0.18 mi²) of the watershed, with 8 percent (0.05 mi²) burned at high severity, including the area of source-water springs. Eagle Rock Creek is tributary to Edgewood Creek near Stateline, Nevada, and has a drainage area of 0.63 mi². Prior to the fire, the Eagle Rock Creek watershed was relatively undisturbed. Nutrient concentrations were routinely monitored for 11 years (1990–2001) by the U.S. Geological Survey as part of the Lake Tahoe Interagency Monitoring Program. Monitoring resumed immediately after the fire was extinguished to determine what effects the wildfire and fire suppression activities had on the stream-nutrient concentrations of Eagle Rock Creek. This monitoring continues and the comparison analysis in this poster represents data through March of 2006 and is provided as an update to Allander, 2004.

Nutrient Concentrations

Stream-nutrient concentrations in Eagle Rock Creek increased as a result of the Gondola Fire (fig. 2). Median concentrations of soluble reactive phosphorus (SRP) more than doubled, increasing from 0.010 milligrams/liter (mg/L) to 0.025 mg/L. Median concentrations of total phosphorus (TP) nearly doubled, increasing from 0.032 mg/L to 0.052 mg/L. Median concentrations of filtered nitrate plus nitrite (NO₃) had a 6-fold increase from 0.011 mg/L to 0.065 mg/L. Median concentrations of total organic nitrogen plus ammonia (TKN) had a modest increase from 0.120 mg/L to 0.180 mg/L. Median concentrations of filtered ammonia (NH₄) remained at less than the reporting limit of 0.003 mg/L.

Trends

Post-fire trends in concentrations for NO₃ show a continued seasonal variability much greater than pre-fire (fig. 3). However, the post-fire trend in concentrations for SRP indicates that, nearly 4 years after the fire, SRP concentrations have almost returned to pre-fire levels. Overall, the data indicate that wildfires within the Lake Tahoe Basin can increase nutrient concentrations in tributary streams for years after they have been extinguished.

References

Allander, K.K., 2004, The effect of a large uncontrolled wildfire on stream-nutrient concentration within an undisturbed watershed in the Lake Tahoe Basin [abs.]: Research as a Tool in Tahoe Basin Issues, 2nd biennial conference on Tahoe environmental concerns, Crystal Bay, Nevada, May 17-19, 2004, Publication of Abstracts, p. 36.

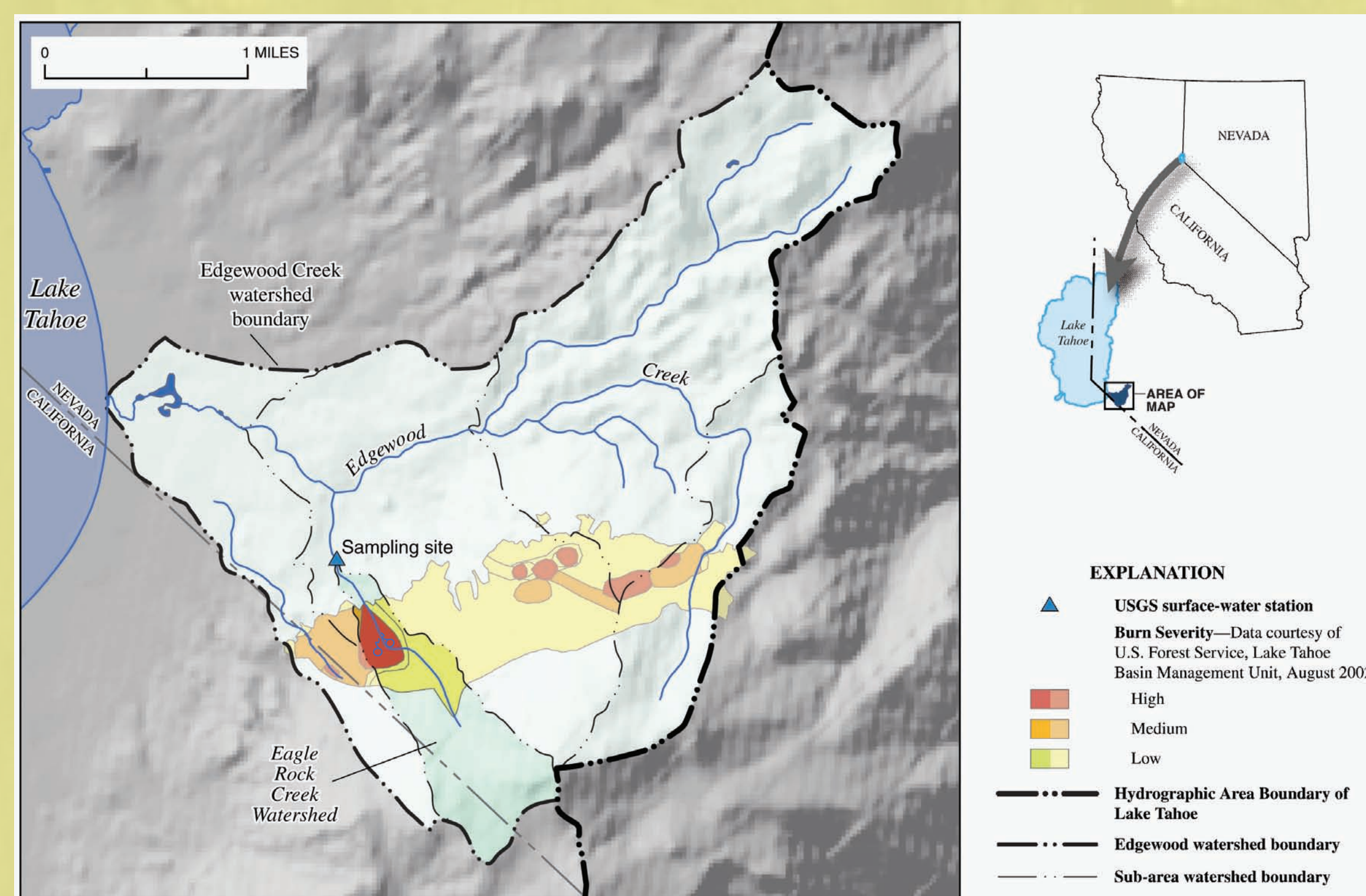


Figure 1. Location of Eagle Rock Creek watershed in South Lake Tahoe, Nevada and California.

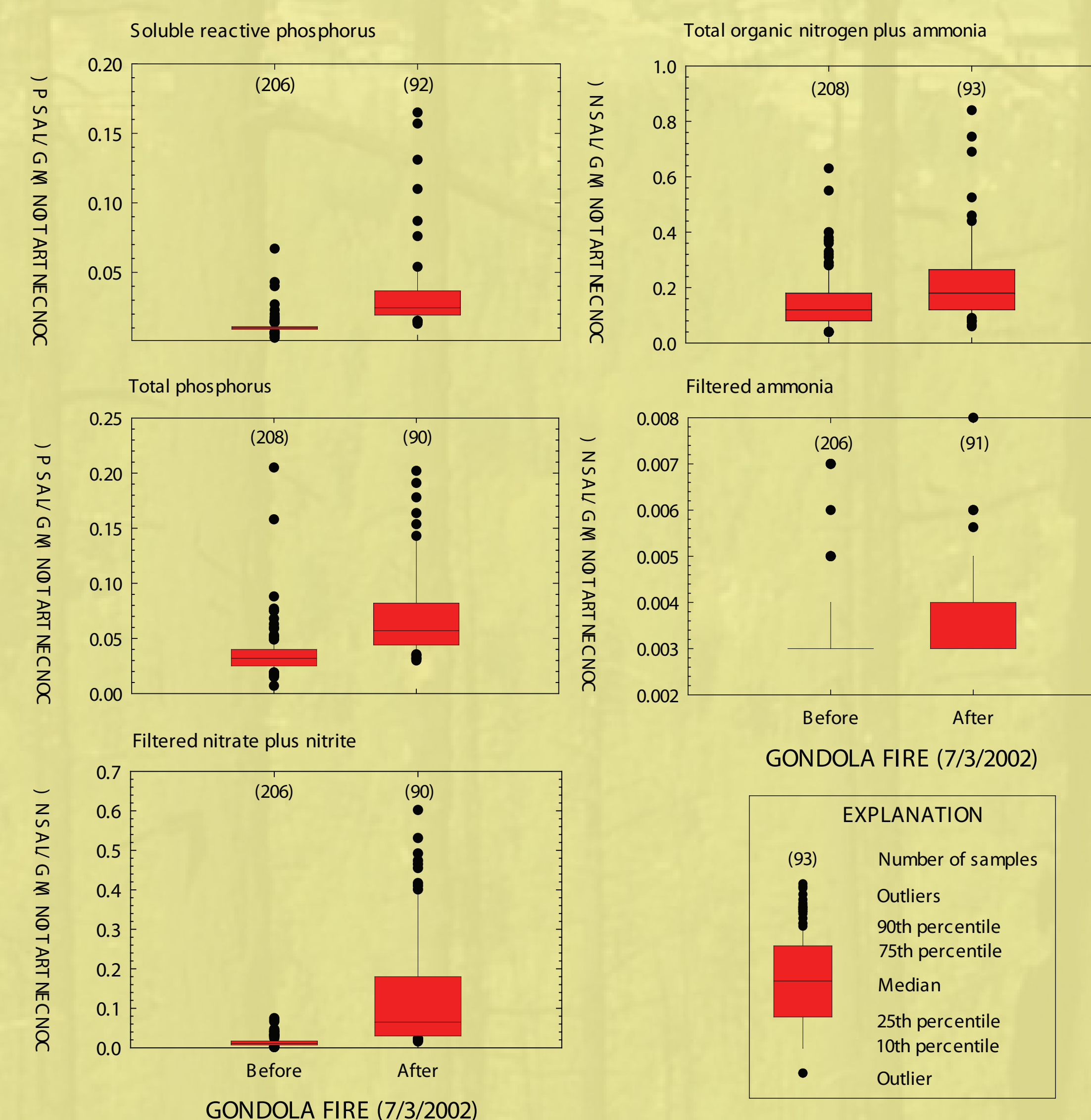


Figure 2. Comparison of nutrient concentrations of Eagle Rock Creek before and after the Gondola Fire. Data through March 2006.

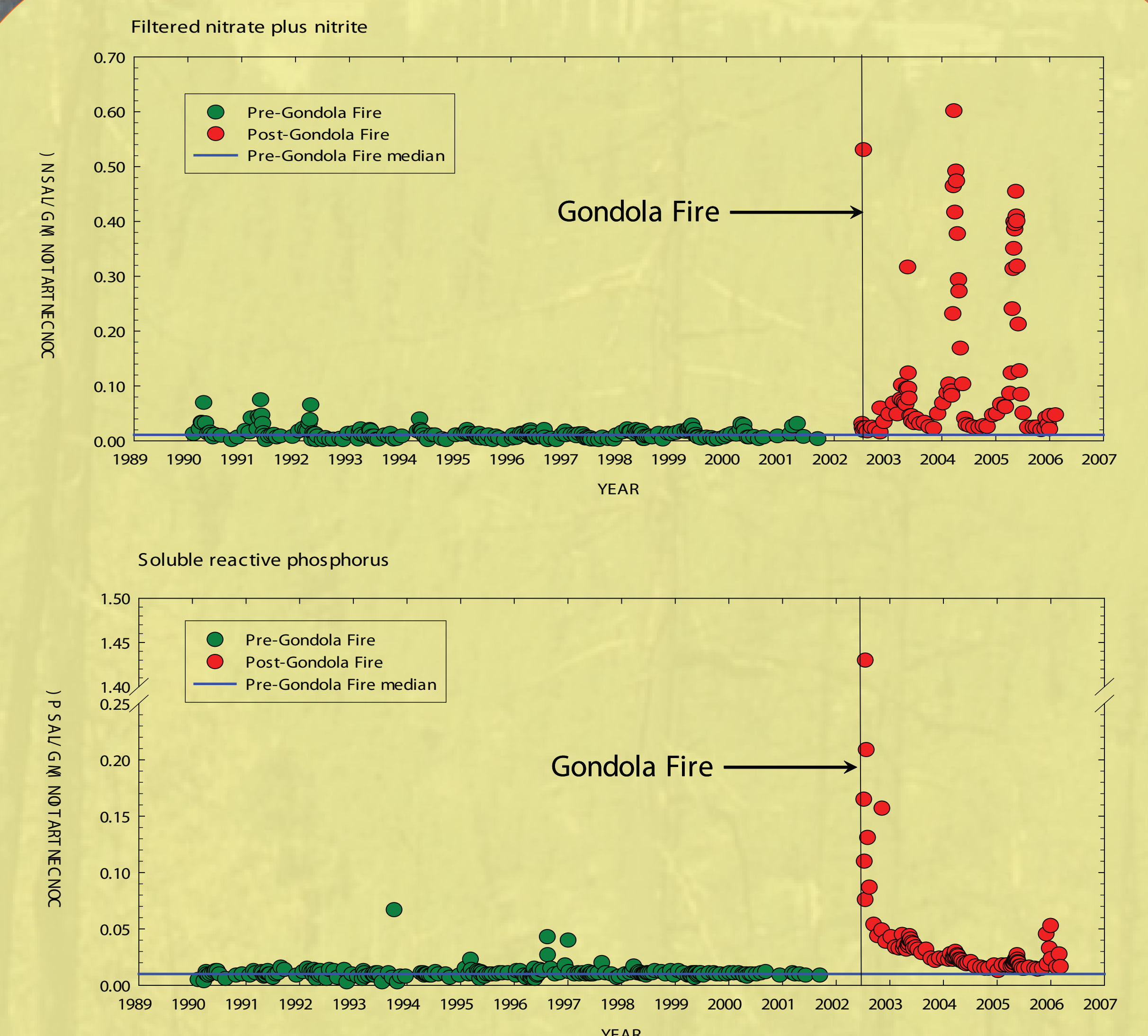


Figure 3. Trends in concentrations of Eagle Rock Creek in (A) NO₃ and (B) SRP. Data through March 2006.